U.S ENVIRONMENTAL PROTECTION AGENCY - REGION 5

Proposed Plan to Amend the September 2007 Record of Decision for the OMC Plant 2 Site

Outboard Marine Corporation Superfund Site
Waukegan, Illinois
ILD000802827

July 2012

The United States Environmental Protection Agency (EPA), in consultation with the Illinois EPA (IEPA), is releasing this Proposed Plan for the Outboard Marine Corporation (OMC) Plant 2 Superfund site for public comment in accordance with Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires the issuance of decision documents for remedial actions taken pursuant to Sections 104, 106, 120, and 122. Sections 300.430(f)(2), 300.430(f)(4) and 300.435(c)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establish the regulatory requirements for decision documents.

Following finalization of this Proposed Plan and in consultation with our state partner IEPA, EPA will select a final cleanup plan for the site. The final cleanup plan will be presented in an EPA document called a Record of Decision (ROD) Amendment and could differ from this Proposed Plan. The ROD Amendment will become part of the Administrative Record file to comply with NCP 300.825(a)(2).

A. Introduction

EPA and IEPA have determined that the ROD signed September 10, 2007, for the OMC Plant 2 (Operable Unit (OU) 4) site in Waukegan, Illinois, needs to be amended. The 2007 ROD addressed the removal of OMC Plant 2 building materials (demolition and off-site disposal), sediment and contaminated soil (excavation and off-site disposal). The purpose of this Proposed Plan to amend the 2007 ROD is to give background information about the site, describe the various cleanup alternatives considered, and identify EPA's preferred cleanup alternative. The public is encouraged to review and comment on this Proposed Plan. EPA will be accepting public comments during a 30-day comment period. The public is also encouraged to attend and participate in a public meeting that EPA will hold at the Jane Adams Center at 95 Jack Benny Drive, Waukegan, Illinois, on Tuesday, July 24, 2012, at 7 pm.

EPA is proposing to amend the 2007 ROD to address additional volumes of contamination discovered after the Plant 2 building was demolished, as well as contaminated soil surrounding buried utility lines. Because site conditions are not favorable to complete the planned excavation of all contaminated soil from certain designated areas of the OMC Plant 2 site, soil excavation is no longer the most effective engineering solution. Instead, the Agency is proposing to amend the 2007 ROD to allow for containment of the contaminated soil in place in designated areas. These areas are located in the north and west utility corridors and the former "Old Die Cast Building" (ODC) area.

EPA is proposing the following remedial measures: 1) contain contaminated soil in the area beneath the ODC with a slurry wall coupled with a 35 Illinois Administration Code (IAC) Part 811 Solid Waste Landfill cap. The containment is needed because it is not feasible to remove the contaminated soil to achieve cleanup goals; 2) cap and manage contaminated soil in place within the western and northern utility corridors that cannot be excavated due to the presence of a large diameter sewer line and high pressure natural gas line; 3) place institutional controls in site areas where hazardous substances will remain above cleanup levels in the utility corridors and beneath the capped area to eliminate potential exposure to contaminants; and 4) monitor the containment remedy for short- and long-term effectiveness and protectiveness.

These measures to remedy the two utility corridors and the ODC areas of the site will: 1) protect human health and the environment; 2) meet applicable and/or relevant and appropriate regulations; 3) be cost effective; 4) be effective in the short and long term; 5) be implementable; and 6) reduce the mobility of contaminants.

After review and consideration of information provided by the public during the comment period and public meeting, and in consultation with IEPA, EPA will select a final cleanup plan for contaminated soil in the specific areas of the site described above. The final cleanup plan will be announced in local newspaper notices and presented in an EPA document called the Record of Decision (ROD) Amendment. The final plan could differ from this Proposed Plan depending on information or comments EPA receives during the public comment period.

The public is also encouraged to review the supporting documents for the OMC Plant 2 site at any of the following locations: the Waukegan Public Library located at 128 N. County St. Waukegan, Illinois 60085 and EPA Records center located at 77 W. Jackson Blvd. Chicago, Illinois 60604. The supporting documents include, but are not limited to, the April 2006 Remedial Investigation (RI) Report, the December 2006 Site Feasibility Study (FS) Report, the 2007 ROD, a June 2008 Basis of Design Report, November 2009 Addendum to the Basis of

Design Report, and the June 2012 Site Focused Feasibility Study (FFS). As part of the RI Report, a Human Health and Ecological Risk Assessment within the RI Report studied the potential for health effects to residents and workers from the remaining site soil contamination and effects on the environment from contamination at the site. The 2006 FS identified, evaluated, and compared different cleanup alternatives. The 2012 FFS identified, evaluated, and compared different cleanup alternatives after additional information was obtained during remedial actions (RA).

B. Site Background

The OMC Plant 2 site is the fourth of four Operable Units (OUs) of the OMC National Priorities List (NPL) site and is located at 90 Sea Horse Drive in Waukegan, Illinois, about 40 miles north of Chicago (Figure 1). Figure 2 displays all four OMC site OUs, which include the Waukegan Harbor site (OU #1), the Waukegan Manufactured Gas and Coke Plant (WCP) site (OU #2), and the PCB Containment Cells (OU #3).

EPA is the lead agency and IEPA is the support agency at the OMC site. To date, we have used potentially responsible party (PRP) and Superfund trust fund monies to perform several time-critical removal actions, a pilot test study for groundwater cleanup, a bench scale study for dense, non-aqueous phase liquid (DNAPL)[1] cleanup, a RI/FS, Remedial Design/Remedial Action (RD/RA) and a FFS at the OMC Plant 2 site.

OMC Plant 2 site is a 60-acre lakefront parcel that contained an abandoned industrial facility in which OMC manufactured outboard motors. At one point the facility had used polychlorinated biphenyl (PCB)-containing hydraulic and lubricating oils in its production lines and routinely discharged some of the fluids into outside holding lagoons or ponds. Poor housekeeping led to extensive PCB contamination inside the facility. Fluids were also discharged via sewer lines into Waukegan Harbor (OU #1), thereby becoming the source of very high-level PCB contamination in harbor sediment. OMC also operated several vapor degreasers at the OMC Plant 2 facility to clean newly made parts with trichloroethylene (TCE). Leaking degreasers and/or TCE storage tanks over the years created a widespread groundwater contaminant plume of dissolved TCE and a sizeable pool of pure, undissolved TCE or DNAPL beneath the site. OMC declared bankruptcy in December 2000 and ceased all local operations in August 2001. Much of the OMC site is now owned by the City of Waukegan.

The 2006 RI and FS identified the following:

- PCB contaminated concrete slab, walls and ceiling in the ODC building, parts storage, and metal-working areas
- PCB contaminated soil beneath the northern and southern parking lot areas and east of the plant contain PCBs and/or Carcinogenic Polycyclic Aromatic Hydrocarbons (CPAHs) at levels that exceed their respective preliminary clean up goals

[1] DNAPLs are high concentrations of chlorinated solvents, such as trichloroethylene, that are denser than water. Because of their physical and chemical properties, they sink to the bottom of the groundwater aquifer and do not mix easily with water, acting as a continual source of groundwater contamination until they are removed. Other DNAPLs include coal tars, which contain polycyclic aromatic hydrocarbons (PAHs), and transformer oil, which usually includes mixtures of polychlorinated biphenyls (PCBs).

- PCB DNAPL adjacent to the former hazardous waste storage building that was likely from the ODC area or hazardous waste storage building.

The 2007 ROD selected a remedy for soil, sediments and Plant 2 building debris at OU4 as follows:

- Excavate soil and sediment contaminated with PCBs exceeding 1 part-per-million (ppm) and CPAHs exceeding 2 ppm
- Abate asbestos materials
- Demolish and remove OMC Plant 2 materials
- Dispose soil, sediment and building debris offsite

The overall aim of the 2007 ROD and all other remedial actions at the OMC site has been to allow the city of Waukegan an opportunity to plan and develop the OMC site for residential use with minimal institutional controls. The 2007 ROD achieved this purpose by selecting a remedy in which all waste would be removed off-site. The 2007 ROD addressed soil but not groundwater contamination at OU4. The February 2009 ROD for OU4 addressed groundwater.

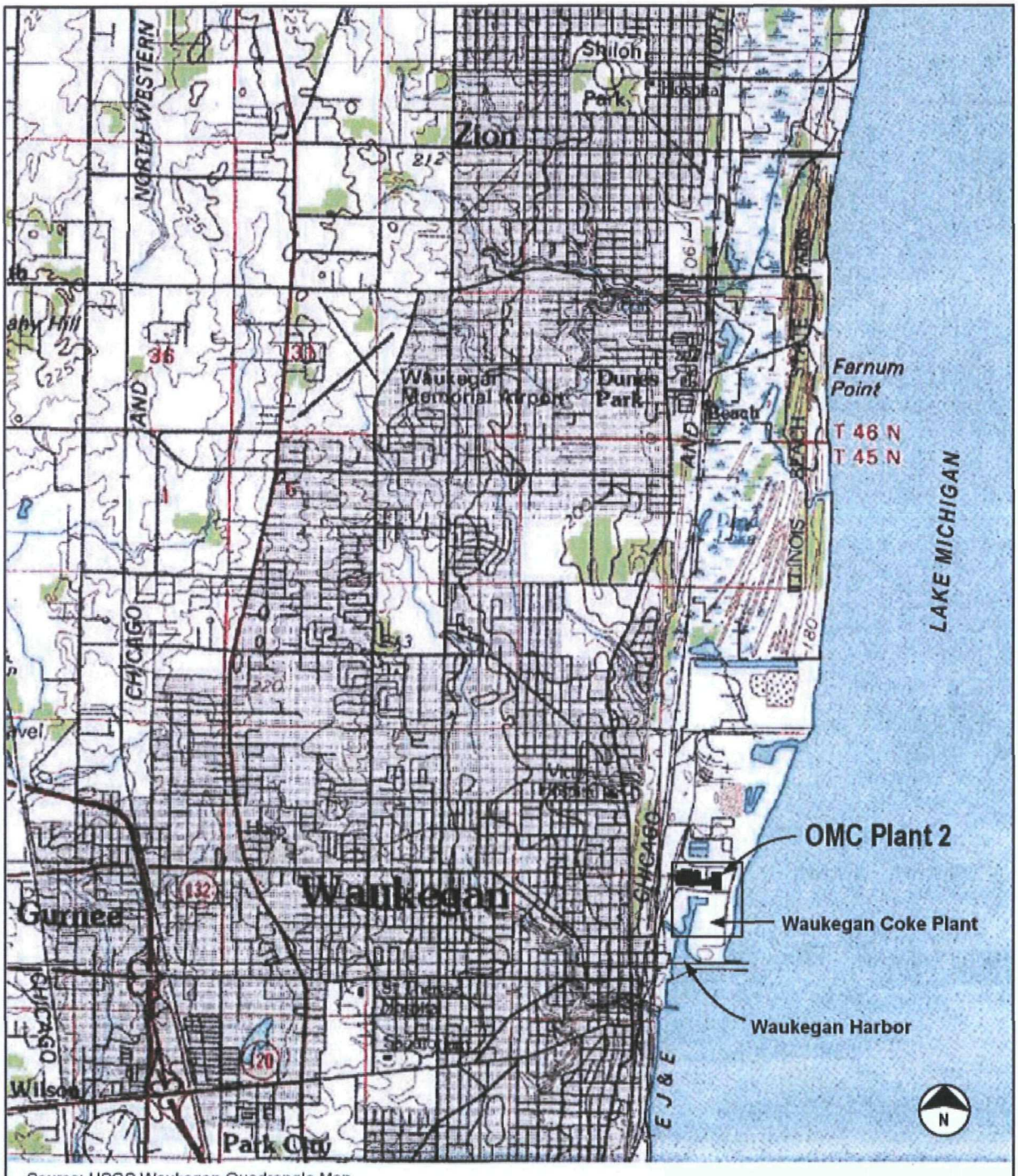
The RA activities started in late 2009. Demolition of Plant 2 buildings occurred around mid 2010. From 2010 through 2012 the building, soil, and sediment RA activities included the following:

- Asbestos abatement and building demolition
- Removal and offsite disposal of building debris, crushing and onsite reuse of some building concrete
- Excavation and offsite disposal of soil and sediments from contaminated areas
- Excavation and capping of the North Ditch

The OU4 RA identified three problematic contamination areas that prompted a reevaluation of the selected remedy. During the soil remediation activities EPA discovered extensive PCB DNAPL contamination in the ODC area of OMC Plant 2. This area is the western-most area of the former plant. Confirmatory soil sampling by EPA revealed contamination extending to depths below the water table, making conventional excavation and dewatering extremely expensive.

The ODC area of the former Plant 2 is adjacent to the EJ and E Railroad property and the adjoining West Utility Corridor which houses a large diameter sanitary sewer main flowing to the North Shore Sanitary District treatment plant. Additionally, portions of the sewer main lie beneath the removed Plant 2 building slab. Based on the interconnection of the utilities on the western-most boundary of the site and the high concentration of PCB DNAPL contamination in the ODC area, it is likely that the subsurface contamination extends into the Western Utility Corridor housing the sanitary sewer main. Excavation near this sewer main would result in unacceptable risks due to structural damage possibilities of an active utility.

After some soil excavation, confirmatory soil sampling of the northern-most portion of the OMC site by EPA reveal that high levels of PCBs remain. This area overlies a 12-inch high-pressure natural gas pipeline and the North Shore sanitary sewer main. This area has been identified as the North Utility Corridor. The risk associated with excavation near this high-pressure gas main required a closer examination of the selected remedy. These documented results, findings and other new information supporting the need for this Proposed Plan for a ROD Amendment may be found in the 2012 FFS in the Administrative Record file for the site.



Source: USGS Waukegan Quadrangle Map

0 3,000 Feet

Figure 1

Site Location Map

OMC Plant 2 and Vicinity

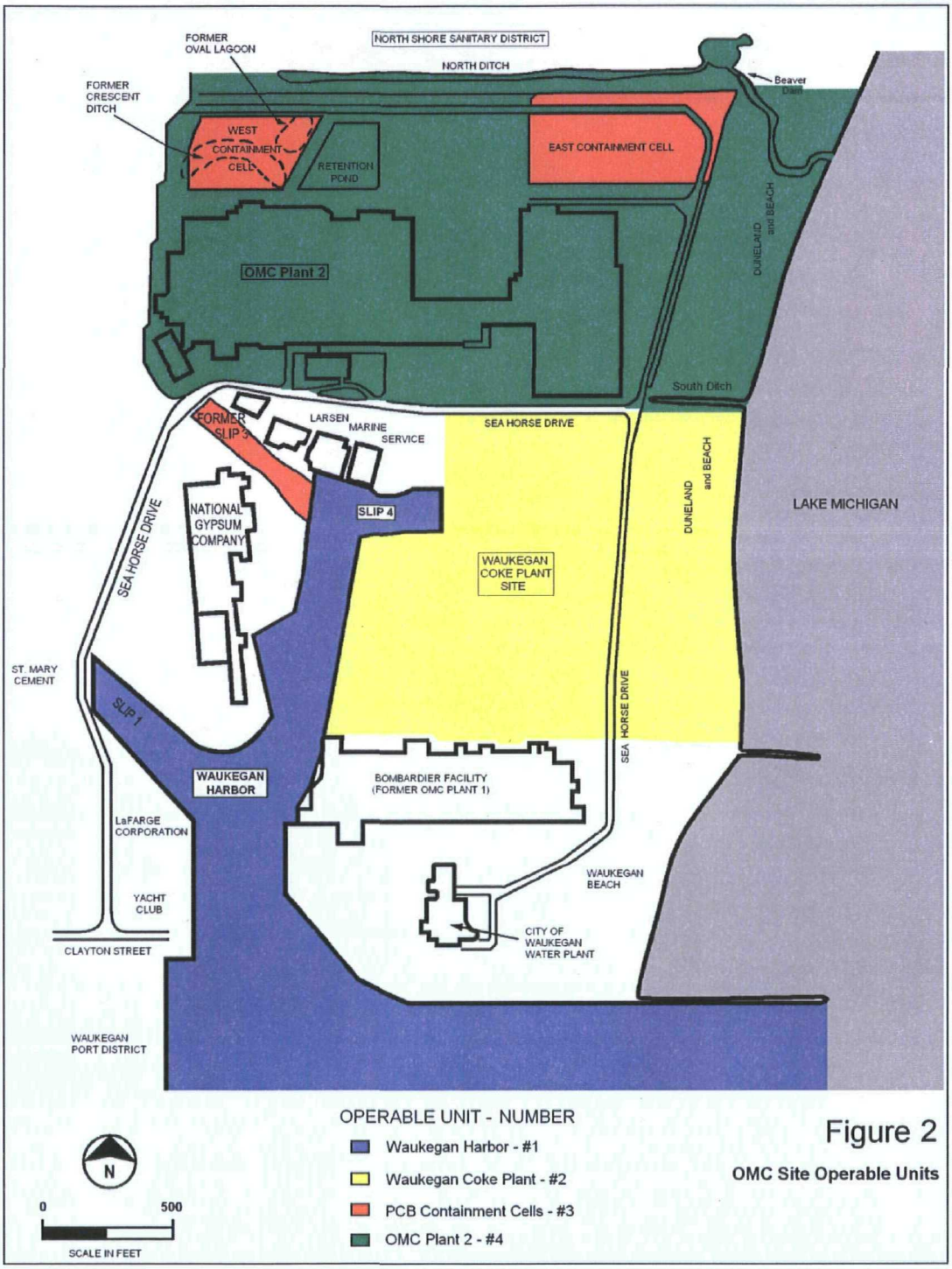


Figure 2

OMC Site Operable Units

C. Site Characteristics

OMC Plant 2 site is a 60-acre property located in Waukegan, Illinois (Figure 3) bordered by North Shore Sanitary District (NSSD) to the north, Lake Michigan to the east, Sea Horse Drive and Waukegan Harbor to the south, and E.J. & E. Railway tracks to the west. The North Ditch drains upland (off site) areas and runs along the NSSD border towards Lake Michigan until it makes a sharp turn to the south very close to the lake. The lakefront side of the site is emergent dune land and beachfront. Except for the North Ditch, there are no existing wetlands on the site.

Figure 3: Aerial photo of OMC Plant 2 site (outlined in green)

OMC manufactured outboard motors from about 1948 until 2000 in the 1,060,000 ft^2 OMC Plant 2 facility. OMC used PCB-containing hydraulic and lubricating oils in its production line machinery beginning in 1961 until 1972 and allowed some of the oils to empty into floor drains. The floor drains emptied into sewer lines that discharged into (former) Boat Slip #3 and the former Crescent Ditch and Oval Lagoon (Figure 2) site features. Runoff from the Crescent Ditch and Oval Lagoon fed into the North Ditch. OMC Plant 2 thus was the source of PCB contamination in Waukegan Harbor sediment (via the Boat Slip #3 outfall) and likely a source of PCB contamination in Lake Michigan (via the Oval Lagoon, Crescent Ditch, and North Ditch drainage system). The Oval Lagoon and Crescent Ditch were covered or filled in as a result of

the 1990-1992 harbor cleanup action and no longer exist. The west containment cell now occupies the land in their place.

OMC operated several leaking vapor degreasers and storage tanks at the OMC Plant 2 facility to clean newly made parts with TCE.

Before EPA began the RI in 2004 and the FS in 2005 at the site, it gathered existing site environmental information and mapped out a sampling strategy based on the following known facts or criteria:

- The 1984 ROD/1989 ROD Amendment for the OMC site selected a PCB cleanup level of 50 ppm in Waukegan Harbor sediment and in soil near the OMC Plant 2 facility; EPA's current cleanup goal for PCBs is set at 1 ppm or less for residential soil cleanups;
- OMC had determined that its OMC Plant 2 facility was sitting over extensive groundwater contamination (TCE and its breakdown products) based on sampling work and reports it had commissioned in the 1990s;
- OMC had numerous Resource Conservation and Recovery Act (RCRA)-permitted chemical storage units on site, some of which it had removed or closed before it declared bankruptcy in December 2000;
- The groundwater aquifer beneath the site is a 20 to 30-foot layer of sand deposited on a thick layer of clay or "hardpan;"
- The OMC Plant 2 building was likely impacted by PCB contamination inside based on PCB-usage records and the general 'filthy' appearance of the soon-to-be abandoned facility in mid-2002; and
- OMC did not use asbestos-containing material in its manufacturing processes.

Based on the information we gathered at the OMC Plant 2 site, the known or suspected sources of site contaminants included:

- Drainage lines containing PCB-laden hydraulic and cutting oils;
- Vapor degreasers using TCE; and
- Other storage units previously containing paints or fuels.

Thus, EPA's sampling plan for the OMC Plant 2 site included the following tasks:

- Take wipe samples of interior building surfaces for PCB analysis;
- Sample surface and subsurface soil for PCB, volatile organic compound (VOC), semi-volatile organic compound (SVOC), and metals analyses;
- Obtain core samples of interior concrete for PCB analysis;
- Use direct-push technology to determine the nature and extent of groundwater contamination prior to taking groundwater samples for PCB, VOC, SVOC, and metals analyses;
- Sample the DNAPL (if found) for PCB, SVOC, and VOC analyses; and
- Measure indicator compounds in the groundwater to determine whether monitored natural attenuation can be a viable management approach for the site.

EPA's sampling plan was crafted to yield data that would help us determine actual or potential risks to human health and the environment based on current and projected uses for the site. Currently, human receptors use the beachfront and dunes areas on a recreational basis and trespassers or scavengers periodically access the abandoned building. Ecological receptors

also frequent or live in the beachfront and dunes areas. No one is currently using groundwater at the site. Future residential receptors would be using the site if the City's redevelopment plans come into fruition.

EPA's RI/FS sampling results both confirmed OMC's previous groundwater contamination mapping efforts, and showed more widespread areas of contamination than previously known. These areas included the utility corridors and the ODC building portion of the demolished building, as well as following:

- PCB contaminated concrete in the ODC building area and other parts of Plant 2
- PCB and/or CPAH contaminated soil throughout the site
- PCB and VOCs (DNAPL) contaminated soil underneath Plant 2 and concentrated in the ODC area; and
- VOCs in the groundwater

As a result, we identified the following four media of concern at the site and the following cleanup measures were selected. As noted, some of these cleanup measures have already been implemented.

Soil and Sediment

OMC had also excavated soil around the OMC Plant 2 facility as part of the 1990-1992 Waukegan Harbor cleanup action and the selected cleanup level for PCBs in the soil was 50 ppm based on the projected future industrial use of the site. EPA's 2004-2006 RI sampling results showed pervasive, low levels (between 1 and 50 ppm) of PCBs and PAH in site soil and in sediment in the North Ditch and no extensive areas with high levels (greater than 50 ppm) of PCBs or PAHs.

EPA selected a cleanup remedy for soil and sediment in the September 2007 ROD in anticipation that the site would be redeveloped in accordance with Waukegan's lakefront redevelopment plans. We had calculated that about 40,000 cubic yard (yds^3) of soil and sediment exceeded the 1 ppm and 2 ppm cleanup levels for PCBs and PAHs, respectively. Of that amount, about 1,500 yds^3 exceeded 50 ppm PCBs. All soil and sediment exceeding the cleanup levels will be excavated and disposed of off-site.

OMC Plant 2 Building (Interior)

EPA selected a cleanup remedy for the PCB-contaminated building in the September 2007 ROD in anticipation that the site would be redeveloped in accordance with the City's lakefront redevelopment plans. Additionally, EPA would abate any asbestos materials and dispose of them off-site. EPA demolished the remainder of the building and disposed of PCB-contaminated debris in off-site facilities.

Groundwater and DNAPL

EPA selected a cleanup remedy for the groundwater and DNAPL in the February 2009 ROD. In situ soil mixing was conducted in 2011 to treat the DNAPL. An air sparge curtain system was installed along the south end of the site to address potential off-site migration of contaminated groundwater. Injections of sodium permanganate as an oxidizer to degrade groundwater contaminants in one plume area were initiated in May 2012. Injection of soluble substrate enhancing natural bioremediation of groundwater in additional plumes is planned for late 2012. Groundwater-use restrictions have been established for the site.

D. Scope and Role of this Action

EPA expects that the alternative chosen pursuant to this proposed plan will be the final action for contaminated soil at the site. The site remedy will continually be evaluated and monitored to make sure that it is protective of human health and the environment until cleanup standards are reached. The RA Objectives for the soil remedy are to prevent current and future exposure to contaminated soil at the site to allow the city of Waukegan an opportunity to plan and develop the OMC site for residential use.

During implementation of the previously described remedial measures (demolition of the facility), EPA discovered more soil contamination beneath a portion of the former structure referred to as the ODC area than anticipated (see figure 4 below). Additionally, EPA found that excavation of contaminated soil in the North and West Utility Corridors is impractical given that these utilities are still active. This proposed action, chosen pursuant to this proposed plan, will address the ODC and utilities areas that pose these clean up problems that were not anticipated at the time of the September 2007 ROD. The RD phase for these actions was completed December 2007, prior to knowing the extent of soil contamination in the utility corridors and the ODC area. Remedial construction activities of the 2007 ROD remedy began in April 2009 and with the addition of this ROD Amendment work, completion of the soil and sediment remedy for the OMC Plant 2 Site is planned by September 2014.

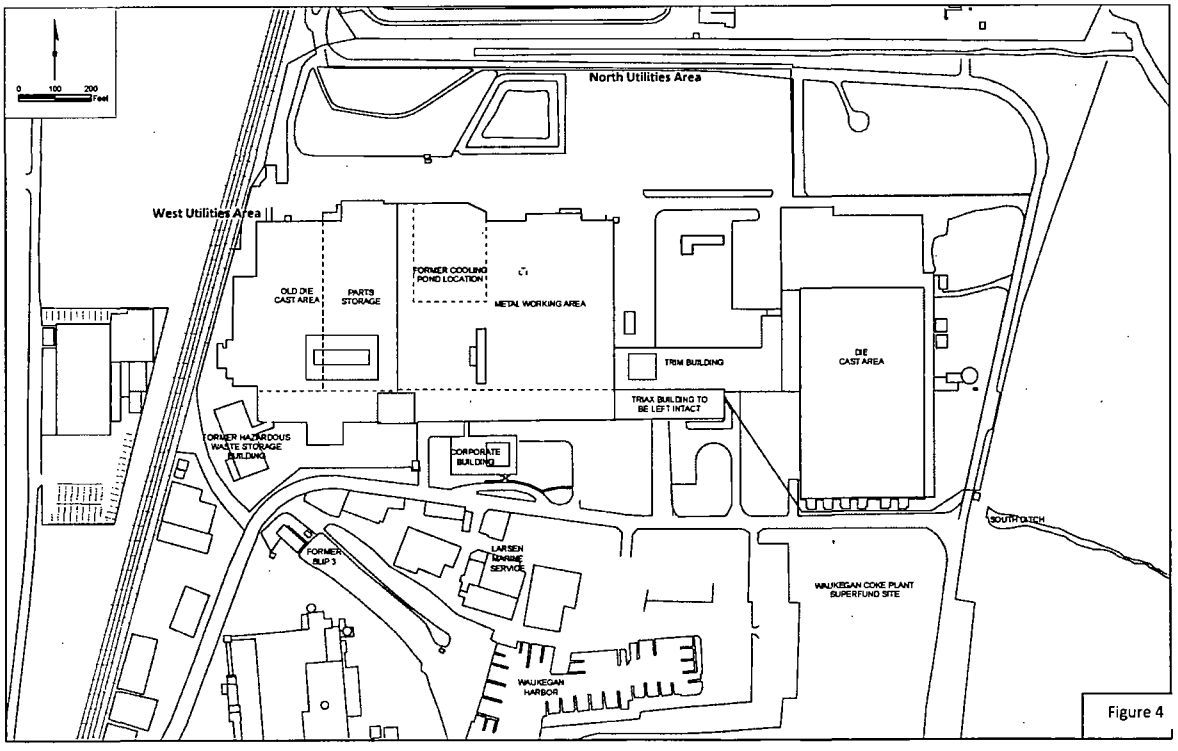


Figure 4

E. Summary of Site Risks

A baseline risk assessment estimates what risks the site poses to human health and the environment if no remedial action was taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the RA.

EPA generally follows a four-step process to prepare the baseline human health risk assessment (HHRA) at Superfund sites:

1. Identify contaminants of concern (COCs);
2. Conduct an Exposure Assessment for COCs;
3. Conduct a Toxicity Assessment of COCs; and
4. Characterize Risk and Evaluate Uncertainties.

EPA evaluated the levels of contaminants found in site soil and inside the former OMC Plant 2 building to determine the actual or potential risks to human health and the environment. We also evaluated risks for groundwater, but we are not selecting a groundwater cleanup method in this ROD Amendment except for potential groundwater risks associated with soil contamination in the identified areas. The steps we took to evaluate actual or potential health risks first included the identification of COCs - those compounds that exceed health-based levels in the soils in the identified areas - using screening level or preliminary remediation goals (PRGs) published by the state of Illinois and/or EPA.

EPA next evaluated chemical fate and transport factors to determine whether the COCs posed potential short-, medium-, or long-term risks at the site. We then examined potential pathways of concern to human health and the environment under current and future site-use scenarios during the exposure assessment. We applied the results of the previous steps to quantify actual or potential risks to human health and the environment by combining exposure level assumptions with estimated carcinogenic risk or toxicity factors for the COCs. The human health and ecological risk assessment work is fully presented in the RI Report, which is part of the Administrative Record for the site.

Contaminants of Concern

Contaminants of concern are those chemicals that potentially present the greatest human health concerns (*i.e.*, those present in the highest concentrations, with the widest distribution or that exhibit the highest mobility or the highest toxicity). Environmental sampling at a site may identify many chemical compounds, whether naturally-occurring or not, at varying concentrations. Thus, the purpose of identifying COCs is to focus the risk assessment on the most important contaminants found.

EPA identified PCBs and PAHs (each as a group) as COCs in site soil and sediment, and PCBs as a COC inside the OMC Plant 2 building (see Table 1).

Table 1: COCs at the OMC Plant 2 site

Media	Contaminant of Concern	Average Concentration	Highest Concentration	Screening Level
Soil	PCBs	18 ppm	790 ppm	1 ppm
Soil	PAHs	1-6 ppm	51 ppm	2 ppm

Notes: "Guidance on Remedial Actions for Superfund Sites with PCB Contamination (August 1990)" recommends a one ppm PCB preliminary remediation goal in residential soil; the PAH screening level is derived from general background values for urban areas in Illinois published by the state.

Levels of the COCs present exceed Toxic Substance Control Act (TSCA) criteria. PCBs and a PCB DNAPL occur in the ODC area down to the base of the aquifer. PCBs were found at high levels in the West Utility Corridor bordering the ODC area. PCBs were also found in the North

Utility Corridor bordering the North Ditch following initial cleanup activities. TCE and its breakdown products (such as vinyl chloride) were also found in some soil samples taken from below the water table near the ODC area; however, TCE will be addressed by the groundwater remedy.

Fate and Transport

PCBs and PAHs tend to adhere to soil and sediment particles and the mobility of these compounds is low. Bioaccumulation is moderately likely to occur in receptors and they do not readily biodegrade. Thus, these COCs, if not addressed, will persist for years to come and be readily available for people and animals to become exposed to them. TCE is mobile but does not bioaccumulate.

Exposure Assessment

EPA examined potential pathways of concern to human health and the environment under current and future site-use scenarios. Major pathways of concern for the actual or potential exposure of nearby human populations, animals, or the food chain to COCs include the following:

Current Pathways

Dermal contact with COCs could occur if people or animals were to recreationally use areas where surface soil or sediment is contaminated, such as in the North and/or West utility corridors along the railroad tracks or between the western and eastern containment cells and North Ditch. Digging in these areas could expose a person or animal to contaminants by dermal contact if one were to touch impacted soil. Digging in these areas could also suspend dust particles into the air, causing them to be an inhalation or ingestion hazard. Subsurface soil is contaminated in the ODC area. Digging in this area could expose a person or animal to contaminants by dermal contact if one were to touch impacted soil.

Future Pathways

Future exposure pathways would be the same as current pathways. If the site is redeveloped, however, there could be a greater amount of exposure to COCs in soils and sediment since people would be living at the site (residential use) instead of using it on a periodic basis (recreational use).

Toxicity Assessment

A toxicity assessment is the determination of how toxic a chemical will be to people or the environment. This assessment is based on peer-reviewed toxicity factors that are developed from animal toxicology tests, occupational exposure, or other means.

Generally, adverse health effects are divided into two categories – cancer causing (carcinogenic) and non-cancer causing (noncarcinogenic). Non-carcinogenic effects are evaluated using reference doses (RfD) developed by EPA. Reference doses are based on the assumption that a certain threshold level of a given contaminant s may pose ill effects to an organ system, such as the liver or kidney (referred to as "systemic effects") due to daily exposure over a lifetime. Reference doses are specific to each chemical and exposure route (i.e., dermal, oral, ingestion). Since carcinogens can also cause damage to organ systems that

does not necessarily result in cancer, we also include this information in our comprehensive assessment of noncarcinogenic effects.

Carcinogenic effects are evaluated using cancer slope factors (SF) that are also specific to each chemical and exposure route. Cancer Slope Factors are developed based on animal toxicology testing, occupational exposure data, or other means.

Of the COCs at the site, PCBs and some of the PAHs are carcinogenic, while other PAHs are noncarcinogenic. Risk calculations were performed separately for carcinogens and noncarcinogens because the adverse health effects are different (i.e., cancer-causing versus causing systemic effects).

Human Health Risks

EPA evaluated the relationship between the magnitudes of actual or potential exposure to COCs at the site with corresponding adverse health effects. An estimate of the increased likelihood and severity of the adverse effects was calculated and used in the assessment of risk for the COCs at the site.

The actual noncarcinogenic risk from exposure to a specific chemical is determined by combining the results of the exposure assessment with the RfD to calculate the hazard quotient (HQ) for each COC. A Hazard Quotient is the ratio of the amount of a non-carcinogenic chemical contaminant that an individual may be exposed to at a site to the amount of the contaminant that causes an adverse toxic reaction within the body.

The total noncarcinogenic risk or Hazard Index (HI) for all chemical exposures is generated by adding the HQs for all COCs that affect the same target organ system or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. An HI of 1 or more would mean that there are enough of the contaminants at the site to cause a toxic effect in a person who is exposed to the contaminants over a lifetime. A HI quotient of less than 1 indicates no adverse health effects would be expected due to lifetime exposure to the COCs at site concentrations.

Carcinogenic risk is generally expressed as the incremental increase in the probability of an individual's developing cancer over a lifetime as a result of lifetime exposure to a carcinogen. Calculated risk values are referred to as an "excess lifetime cancer risks" (ELCR) because the risks would be in addition to the more prevalent risks of cancer that individuals face due to other factors such as smoking or unprotected exposure to too much sunlight. The chance of an individual's developing cancer during one's lifetime from all other causes has been estimated to be as high as 1 in 3.

For example, an ELCR of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure to a carcinogen has a 1 in 1,000,000 (one-in-one-million) chance of developing cancer as a result of site-related exposure to the chemical. The total carcinogenic risk for a given individual receptor (e.g., construction worker, recreational user) is arrived at by combining the carcinogenic risks for all COCs over all exposure pathways.

Target Risk

EPA generally cleans up Superfund sites to reduce contaminant levels or exposure to contaminants so that the estimated ELCRs posed by carcinogenic contaminants fall within a risk

range of 1×10^{-4} to 1×10^{-6} (1 in 10,000 to 1 in 1,000,000) and/or the calculated HI values for non-carcinogenic compounds fall to less than 1. We may use the term "unacceptable risk" when referring to contaminants at concentrations above levels that yield estimated an ECLR greater than 1×10^{-4} or a HI greater than 1 after a risk assessment is performed.

Uncertainties

Calculated ELCRs and HI values are estimates of potential upper-bound risks that are useful in regulatory decision-making. However, it is improper to consider the risk estimates to be representative of actual risk to potentially exposed individuals because the risks were estimated by making numerous conservative assumptions due to uncertainties inherent in the HHRA process. For example, some exposure and toxicity value assumptions have greater amounts of scientific data supporting them than others (that is, a widely-used chemical may be well-studied whereas a newer compound may not yet have any testing data associated with it). Uncertainty is also introduced into the risk assessment process every time an exposure assumption is made based on current or potential site uses.

Ecological Risk Characterization

EPA also examined the potential risks to ecological receptors based upon the COCs found in site soil. The RI evaluated whether contaminants present at the site and surrounding the site represented a potential risk to exposed ecological receptors. Following the 2010 and 2011 RA activities, risks to the ecological receptors would be considered acceptable and no further investigation required. The remaining impacts exceeding cleanup criteria were limited to subsurface soil that does not pose an exposure potential to ecological receptors.

Table 2: ELCR and HI values for exposure scenarios and pathways of concern

Contaminant of Concern	Media	Actual or Potential Use	Exposure Pathway	ELCR	HI
PCBs	Soil	Current Recreational	Dermal contact and ingestion	**2×10^{-4}**	Less than 1
PCBs and PAHs	Soil	Future Residential	Dermal contact and ingestion	**4×10^{-4}**	Less than 1

Note: A value in **bold** indicates that the calculated risk is outside the target risk range (i.e. it presents "unacceptable risk").

F. Remedial Action Objectives

It is EPA's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Remedial Action Objectives (RAOs) are medium-specific or site-specific goals for protecting human health and the environment that are established on the basis of the nature and extent of the contamination, the resources that are currently and potentially threatened, and the potential for human and environmental exposure. Once we complete the clean up actions, we would meet applicable or relevant and appropriate requirements (ARARs) for environmental cleanup actions at the site. EPA does not foresee the need to waive any ARAR requirements.

The following surface and subsurface soil specific RAOs are consistent with the reasonably anticipated future land use for the OMC Plant 2 site. The city of Waukegan has stated its goal of redeveloping its lakefront into a high-density residential area over the next several years. The beachfront area would be retained for recreational use. Addressing the PCBs and the DNAPL media would remove the compounds from the environment or sever the exposure pathways so that human receptors would not be exposed to contaminant levels that create unacceptable risks. The majority of the site will achieve elimination of exposure and unrestrictive residential use. The RAO for this forthcoming ROD Amendment will consist of some area with restrictive residential use.

There is potential for unacceptable risks to construction workers due to onsite soil. The exposure is limited to construction workers because: 1) the remaining soils in the ODC Building area with elevated PCB concentrations are only present in the subsurface soils, 2) and surface and subsurface soils in the vicinity of the West Utility Corridor and North Utility Corridor are not suitable for residential use. These objectives will also eliminate potential exposure to ecological receptors.

The RAOs for subsurface soil at the OMC Plant 2 Site include the following:

- Prevent construction worker exposure via, contact, ingestion, or inhalation of contaminated soil that would present an ELCR greater EPA's acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$.
- Clean up soil and groundwater to the extent practicable to minimize migration of contaminants in groundwater.

Preliminary Remediation Goals

Preliminary Remediation Goals (PRGs) are site-specific, quantitative goals that define the extent of cleanup required to achieve the RAOs. These PRGs are developed and used in the FFS, and will be finalized in the ROD Amendment for the OMC Plant 2 Site. PRGs were developed to define the extent of contaminated media requiring remedial action. Volumes of affected media exceeding the PRGs that will be addressed in the FS process are defined below.

In general, PRGs establish media-specific COCs that will pose no unacceptable risk to human health and the environment. The PRGs are developed considering the following:

- Risk-based concentration levels corresponding to an ELCR between 1×10^{-4} and 1×10^{-6}, a chronic health risk defined by a hazard index of 1, and/or a significant ecological risk. As discussed earlier, PRGs for ecological receptors are not needed at the OMC site because the areas presenting potential risk have been remediated.
- Chemical-specific ARARs/TBCs including federal MCLs for groundwater, Illinois Water Quality Standards for Class 1 groundwater, and IEPA TACO Tier 1 remedial objectives for soil and groundwater. The TACO Tier 1 remediation objectives are TBCs that are set at the HI of 1 and ELCR values at $1x10^{-6}$. The ELCR values could be modified upward to represent the values corresponding to a cumulative risk of $1x10^{-4}$.

A summary of PRGs for site soil and groundwater exposure pathways are included in Table 3.

TABLE 3
Soil Preliminary Remediation Goals
OMC Plant 2

	US EPA Risk Assessment Regional Screening Level			TACO Tier 1	
Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Risk-based Soil Screening Level for Protection of Groundwater (mg/kg)	Residential Soil Ingestion (mg/kg)	Construction Worker Soil Value Ingestion (mg/kg)
PCB 1232 (Aroclor 1232)	0.14	0.54	0.000074	1	1
PCB 1242 (Aroclor 1242)	0.22	0.74	0.0053	1	1
PCB 1248 (Aroclor 1248)	0.22	0.74	0.0052	1	1
PCB 1254 (Aroclor 1254)	0.22	0.74	0.0088	1	1
PCB 1260 (Aroclor 1260)	0.22	0.74	0.024	1	1

Selected PRG highlighted in bold with shaded background.
US EPA soil screening levels correspond to a 10^{-6} risk level (November 2011)
Illinois Water Quality Standard – Groundwater Class I – Illinois Administrative Code Title 35: Environmental Protection, Subtitle F: Public Water Supplies, Chapter I: Pollution Control Board, Part 620 Groundwater Quality, Section 620.410 Groundwater Quality Standards For Class I: Potable Resource (Illinois Administrative Code 2002)
TACO – Tier 1 Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route – Appendix B, Tables A&B (IEPA 2007)

Preliminary Remediation Goals for Soil

Based on the potential future exposure risks and the RAOs for soil, PRGs were developed for construction worker exposure to subsurface soil. PRGs were not developed at this time to address the RAO to prevent leaching of soil contaminants to groundwater. There are no TACO Tier 1 criteria for the soil component of the groundwater ingestion exposure route.

Soil PRGs for PCBs and for each of the exposure pathways are presented in Table 3. PRGs developed for construction worker protection from direct contact ingestion and inhalation exposures were applied to all subsurface soil. The unsaturated zone soil (less than 5 to 8 feet deep) was previously excavated in the ODC Building area during the RA. Confirmation sampling in that area indicated soils in the saturated zone had highly elevated PCB concentrations that are the focus of this ROD Amendment.

Contaminated Media Exceeding PRGs

Data generated during the soil excavation and demolition RA were examined to determine the areas and depths of soil and groundwater that exceed the PRGs. Data indicate that PCB-contaminated soils exceeding the PRGs remain in following areas:

- **Old Die Cast Building area.** The RA called for excavation and removal of PCB-contaminated soil below the water table. The excavation was to be stabilized with slightly PCB-contaminated crushed concrete derived from other areas of the site. Confirmation sampling conducted at the base of the excavations conducted in this area range from 30.5 to 11,700 mg/kg. The depth of the contamination has not been fully defined. The extent of the contaminated area is estimated to be five acres and includes the area under the building footprint, the PCB DNAPL area, and buffer area around the perimeter of these areas in the event of limited PCB migration.

- **West Utility Corridor adjacent to the railroad tracks.** This area contains an aging, large-diameter force main connecting nearby suburbs to the North Shore Sanitary District treatment plant. Portions of the sewer force main and its connections run underneath the site where the former Plant 2 building existed. PCB concentrations detected in the soils indicate that PCB DNAPL may also exist. The location of the force main prevents the necessary excavation of the PCB-contaminated soils to achieve cleanup goals.

- **North Utility Corridor adjacent to the North Ditch.** Confirmation soil samples collected from the base and side walls of the RA excavation ranged from 1.01 to 2,410 ppm total PCBs. This area contains a 12-inch-diameter; high-pressure gas main. The location of the gas main prevents the necessary excavation of the contaminated soil to achieve cleanup goals.

PCB impacted soils in these areas will be managed in place using a soil management plan and ICs, as other remedial measures involving excavation or treatment are not feasible.

G. Summary of Alternatives

Remedial alternatives for the OMC Plant 2 (OU 4) site soils at depth and in the utility corridors are presented below. The alternatives are numbered to correspond with those in the 2012 FFS.

Common Elements

This proposed plan for ROD Amendment addresses a small area within the OMC Plant 2 site (OU 4). Since soil excavation at OU 4 terminated at the water table, ICs will be needed in all areas to prevent exposures to workers excavating soil at depth. A Soil Management Plan, similar to the plan created for the Waukegan Coke Plant site (OMC site OU 2) will be needed to address any soil excavation below the water table. The plan identifies where contaminated soil is left in place and instructs construction workers of proper handling of hazardous materials. Additionally, all of the alternatives, with the exception of the "No Action" alternative (Alternative 1), also contain two common components, local ICs and containment. The "No Action" response includes no action for the PCB contaminated subsurface soils. Except for Alternative 1, all the alternatives include ICs to limit the use of portions of the site property, preserve the soil cap or cover, and ensure that workers are not exposed to the contaminated soil. Except for Alternative 1, all the alternatives are containment based approaches.

ICs, such as access restrictions or a restrictive covenant on the property deed of the OMC site limiting intrusive activities on the property will be necessary either as a stand-alone action or in concert with other actions. Institutional controls will be implemented under EPA oversight with the necessary involvement of the appropriate state, city and other support agencies. Because some contamination is being left in place, none of the alternatives will allow for unrestricted use of the property by the city as presented in the 2007 ROD.

IC guidance can be found at: http://www.epa.gov/superfund/action/ic/guide/index.html

Ensuring the effectiveness of the remedy and the institutional controls is a component of each alternative (except Alternative 1) and will be implemented by the property owners. Monitoring and control of air quality (dust) during construction will be required for all alternatives.

Containment is used to minimize the risk of contaminant migration as well as prevent direct contact exposures. Surface controls such as grading and vegetating can be used to reduce infiltration of precipitation through contaminated soil and prevent further erosion and offsite transport of contaminated soil. Capping and subsurface barriers are two remedial technologies that could also be used to limit exposure to contaminants, prevent contaminant migration, and limit the infiltration of precipitation.

Cleanup Alternatives

EPA considered five alternatives for cleaning up the OMC site, each of which was evaluated against nine criteria required by the Superfund National Contingency Plan. See the "Explanation of the Nine Evaluation Criteria" section below. Cost estimates are accurate within plus 50 to minus 30 percent.

Cleanup Alternative 1—No Further Action

The objective of Cleanup Alternative 1, the No Further Action Alternative, is to provide a baseline for comparison to other alternatives, as required by the NCP. Alternative 1 does not include any further remedial action for soil. It does not include monitoring or institutional controls, but includes costs for five-year reviews.

Estimated periodic cost for 30 years - $90,000
Estimated O&M Cost - $0

Cleanup Alternative 2— 35 Illinois Administrative Code (IAC) Part 811 Cap, ICs and Monitoring

Deed notices and restrictive covenants would be added to the property's deed to notify future property owners that the identified soils at the site pose risks to human health and the environment. Measures would be taken to ensure that land-use restrictions would be maintained in the event of future property transfers and acquisitions. The restrictive covenant preventing the use of onsite groundwater would also be maintained, and additional ICs would be included to control excavation and disposal of PCB-contaminated soils. We anticipate that the ICs will be similar to those employed at the Waukegan Coke Plant OU 2 site. The following are examples of ICs that have been, or will be, employed at the OU 2 site:

- A Notice of Land Use Restrictions and ICs (Deed Notice) will be recorded with the Lake County Recorder of Deeds.

- Land use approval from the City and agreements for development will require compliance with the ROD and soil management plan and maintenance of engineered barriers, such as caps or covers. The City will provide notice of restrictions.

- An ordinance will be enacted by the city to prohibit the use of groundwater as a potable water supply and to require the use of the municipal water supply for potable use.

The specific ICs for the OMC Plant 2 Site will be specified in a soil management plan. The soil management plan will also present the requirements for handling soil materials and for conducting subsurface activities at the site.

The areas adjacent to the North Ditch and the West Utility Corridor contain active utilities that may require periodic repairs, upgrades or other activities. Because it may not be possible to implement deed notices or restrictive covenants for these areas, notifications will be placed in the city and the Illinois One-Call System databases to alert workers of the potential hazards of conducting subsurface activities in these areas. In addition, Nicor and the North Shore Sanitary District will be notified of the estimated extent of contaminated soils in their respective right-of-ways/easements for incorporation into their worker notification systems (as possible). The preliminary design investigation in the West Utility Corridor will determine the type of ICs for this area, if necessary. If the preliminary design investigation identifies surface soil impacts, ICs or engineering controls, such as a cover, may be required to prevent direct contact with soils. If the preliminary design investigation identifies subsurface soil impacts, ICs may be required to protect construction workers. The soil management plan will identify the requirements for each area.

Groundwater down gradient of the PCB-contaminated soil areas and surface water from the North Ditch would be monitored to verify that PCBs are not being transported from the potential source areas. Monitoring wells would be installed and groundwater and surface water would be sampled semi-annually for the first two years following RA completion. Results would be evaluated and compared against PRGs. Pending analytical results, the monitoring may be reduced to annual sampling. The groundwater and surface water monitoring will be included as part of the long-term monitoring program developed for the OMC Plant 2 site.

An annual monitoring report would be prepared documenting analytical results, site inspections, trend analyses, and proposed changes in the scope and frequency of the monitoring program, if appropriate. Alternative 2 assumes that four monitoring wells and two surface water locations within the North Ditch would be sampled and analyzed for PCBs.

35 IAC Part 811 Cap

The existing topography within the ODC area would be up-graded using imported clean fill, and covered with clay and topsoil to minimize erosion and promote surface water runoff.

The remedial objective of the soil cover would be to restrict access to the subsurface PCB-contaminated soil and to minimize infiltration of water through the contaminated soils. The area to be covered is approximately five acres. The specific location and dimensions of the cover area would be determined during the design and would be consistent with future site development.

The soil and clay cover (cap) area would first be re-graded to establish the required design slopes (assumed to be two-five percent slopes, though steeper slopes may be necessary). The final slopes of the soil cover would be designed to promote runoff while minimizing the potential for erosion. The specific soil type for the soil cover would be evaluated during the design, but for cost estimating purposes, it is assumed that the soil cover would consist of 0.5 feet of topsoil, 3 feet of soil for freeze-thaw protection, double-sided geocomposite, 40-mil linear low-density polyethylene geomembrane, and 24 inches of low-permeability clay soil or a geosynthetic clay liner. The cap would be vegetated to minimize infiltration and erosion. The cap would prevent direct contact, minimize erosion, and reduce infiltration through the contaminated soils.

Estimated Institutional Controls - $50,000
Estimated Pre-design Investigations - $150,000
Estimated Site Preparation - $22,859
Estimated 5 Acre Cover Construction - $1,386,727
Estimated Contractor Oversight - $30,300
Estimated Contingency - $503,000
Estimated Remedial Design and Management - $536,200
Estimated O&M (annual) - $38,000
Estimated periodic cost for 30 years - $90,000

Estimated Cost Cleanup Alternative 2 - $3,300,000

Cleanup Alternative 3—35 IAC Part 811 Cap, Vertical Barrier, Groundwater Extraction and Treatment (creation of inward gradient), ICs, and Monitoring

ICs and Monitoring

The ICs and monitoring component of Cleanup Alternative 3 are the same as for Alternative 2.

35 IAC Part 811 Cap

The 35 IAC Part 811 cap component of Cleanup Alternative 3 is the same as for Alternative 2.

Vertical Barrier Wall

As part of the detailed evaluation, Cleanup Alternative 3 will include a vertical barrier wall that would be keyed a minimum of 3 feet into the glacial till layer and extend from the ground surface resulting in a total wall height or depth of 28 feet. The vertical barrier would be placed around the perimeter of the ODC building area for approximately 2,400 linear feet. The 35 IAC Part 811 Cap will then extend horizontally beyond the limits of the vertical barrier fully encapsulating the contaminated soils.

A limited amount of infiltration is expected to occur through the 35 IAC Part 811 cap and through the vertical barrier walls. The 35 IAC Part 811 cap is not anticipated to allow any infiltration through the cap due to the presence of a impermeable geomembrane. Two vertical extraction wells would be placed at the peak elevations of the 35 IAC Part 811 cover for controlling the groundwater level within the vertical barrier. The extraction wells would discharge to the existing PCB treatment system for the West PCB Containment Cell located just north of the ODC area. The extraction wells would pump at a rate sufficient to draw down the water within the vertical barrier walls creating an inward gradient. Water level monitoring would be performed to evaluate the gradient during operation. The depth to water would be measured in pairs of piezometers located on the inside and outside of the vertical barrier walls. The water table elevation would then be calculated inside and outside the vertical barrier to determine the gradient.

It is anticipated that the same extraction well and piezometer design used in the West PCB Containment Cell would be required for the 35 IAC Part 811 cap, and the pumping rates would be adjusted accordingly to accommodate the infiltration rates for each cap. If selected, evaluation of the upgrades required to the existing PCB treatment system for the West PCB Containment Cell would be performed during the remedial design.

Estimated Institutional Controls - $50,000
Estimated Pre-design Investigations - $150,000
Estimated Site Preparation - $22,859
Estimated 5 Acre Cover Construction - $1,386,720
Estimated Vertical Containment Barrier (bentonite slurry wall) - $814,368
Estimated Contractor Oversight - $30,300
Estimated Contingency - $740,000
Estimated Remedial Design and Management - $492,100
Estimated O&M (annual) - $49,000
Estimated periodic cost for 30 years - $90,000

Estimated Cost Cleanup Alternative 3 - $4,800,000

Cleanup Alternative 4—In Situ Treatment, ICs and Monitoring

ICs and Monitoring

The ICs and monitoring component of Cleanup Alternative 4 are the same as for Alternative 2.

In Situ Treatment

The objective of Cleanup Alternative 4 would be to mix additives into the soil in order to encapsulate the PCB-contaminated soils. Encapsulation increases the soil mass density preventing groundwater flow through the treated area by creating a solid mass with very low permeability. The additives may include bentonite, Portland cement, and cement kiln dust. Bentonite would be added to reduce the torque needed to rotate the augers during soil mixing. In addition, it would reduce the permeability of the mixed soil so that the mass flux from the untreated residuals is greatly reduced. The solidified material would be covered with six inches of soil to establish a vegetative cover that would prevent weathering of the exposed material.

Portland cement or cement kiln dust may be added to encapsulate the contaminated soils. Both additives would be mixed with the PCB-contaminated soils to solidify the soils between the ground surfaces down to the glacial till. Large-diameter (six feet or greater) augers would be advanced to the target depth at which the additives would be injected through the augers. The augers would be advanced and retracted through the soil interval several times to ensure complete mixing. This process would be repeated in overlapping columns until the entire area has been treated.

Prior to implementing of this alternative, EPA would need to conduct a preliminary design investigation to delineate the horizontal and vertical extent of the treatment area. For the purposes of the FS, the estimated area for in situ treatment is five acres, and the total treatment depth is 25 feet based on the average depth to till. In addition, EPA would have to perform an appropriate study to determine the most suitable additive and mix for achieving the RAOs and PRGs. The auger diameter and spacing will be determined during the design.

Quarterly groundwater sampling of eight monitoring wells at four downgradient locations is included as part of the long-term monitoring program developed for the OMC Plant 2 Site. Groundwater samples will be analyzed for PCBs.

Estimated Institutional Controls - $50,000
Estimated Pre-design Investigations - $162,000

Estimated Site Preparation - $22,859
Estimated In-Situ Soil Mixing - $14,319,320
Estimated Contingency - $5,820,000
Estimated Remedial Design and Management - $3,462,900
Estimated periodic cost for 30 years - $90,000

Estimated Cost Cleanup Alternative 4 - $24,000,000

Cleanup Alternative 5—Excavation and Disposal

Cleanup Alternative 5 calls for excavating and disposing offsite the soils in the ODC area with PCB and PCB DNAPL contaminants to prevent construction worker exposure, through contact, ingestion, or inhalation to contaminated soil and to prevent of erosion and offsite transport of soils contaminated at concentrations posing unacceptable risk. The volume of soil to be excavated would be based primarily on the presence of PCBs greater than 1 mg/kg.

Contaminated soils above the groundwater levels have already been removed as part of a previous action. Soils below the groundwater extending to the top of glacial till within the boundary of the ODC area would need to be removed under this alternative. For the purposes of the FFS, it is assumed that the total excavation depth is 25 feet based on the average ground surface and glacial till elevations. The uppermost 5 feet is assumed to be clean fill placed during the remedial action in 2011 and appropriated for reuse as backfill. The material will be excavated and managed onsite until it is placed as backfill. The total estimated volume of PCB contaminated soil exceeding PRGs is approximately 161,334 cubic yards.

EPA assumed ground surface elevation of 585 feet above mean sea level, groundwater elevation of 582 feet above mean sea level, and glacial till layer top elevation of 565 feet above mean sea level in this alternative screening. The main remedial components of include the following:

- Excavation—with sheet pile wall supporting and groundwater control measures
- Disposal

The clean backfill placed in 2011 during the remedial action would be excavated and stockpiled. Soils exceeding the PRGs would be excavated and segregated by area in separate stockpiles that would be sampled for disposal characteristics. The excavated areas would be backfilled with clean material. The stockpiles would be managed appropriately until approval for disposal was received.

Excavated soils would be sent offsite for disposal based on the following criteria:

- Clean backfill (from above the groundwater table) would be stockpiled onsite for reuse during backfilling (40,400 yd^3)
- PCBs less than 50 mg/kg would be sent to a Subtitle D landfill (estimated 96 percent of volume exceeding PRGs or 8,700 ton/154,880 yd^3)
- PCBs greater than 50 mg/kg would be sent to a USEPA-approved TSCA/Subtitle C landfill (estimated 4 percent of volume exceeding PRGs or 6,454 yd^3)

Estimated Institutional Controls - $50,000
Estimated Pre-design Investigations - $162,000

Estimated Site Preparation - $19,300
Estimated Excavation and Disposal - $29,893,631
Estimated Contingency - $10,542,000
Estimated Remedial Design and Management - $6,912,540
Estimated periodic cost for 30 years - $90,000

Estimated Cost Cleanup Alternative 5 - $48,000,000

H. Evaluation of Alternatives

EPA uses the following nine criteria as required by the Superfund NCP to evaluate and compare cleanup alternatives. Each criterion is defined below, followed by a comparison of how each alternative meets or does not meet the criteria.

1. **Overall protection of human health and the environment:** EPA evaluates alternatives to determine whether they can protect human health and the environment from unacceptable risks posed by hazardous substances, pollutants, or contaminants at the site by eliminating, reducing, or controlling exposures.

2. **Compliance with applicable or relevant and appropriate requirements (ARARs):** EPA evaluates alternatives to determine whether they attain requirements under federal, tribal, state, and local environmental laws and regulations, or provide grounds for invoking a waiver.

3. **Long-term effectiveness and permanence:** EPA evaluates alternatives for the degree of long-term effectiveness and permanence they provide and for the degree of certainty that the alternative will prove to be successful.

4. **Reduction of toxicity, mobility, or volume through treatment:** EPA evaluates alternatives to determine the degree to which they employ recycling or treatment to reduce toxicity, mobility, or volume, including how they use treatment to address hazardous substances posed by the site.

5. **Short-term effectiveness:** EPA evaluates short-term impacts on the community and workers during implementation of alternatives. These impacts include transportation (including noise, dust, and traffic hazards), protection of workers, and the timeframe for implementing the remedy.

6. **Implementability:** EPA evaluates the ease of implementing alternatives, considering technical difficulties and reliability of a technology, coordination with other offices and agencies, and availability of services and materials.

7. **Cost:** EPA evaluates capital and ongoing costs.

8. **State Acceptance:** EPA evaluates the state's positions and key concerns on the preferred alternative and other alternatives considered, as well as comments on ARARs or proposed use of waivers. This assessment is completed after comments on this Proposed Plan are received.

9. **Community Acceptance:** EPA evaluates the community's support of, reservations about or opposition to components of the alternatives considered. This assessment is completed after comments on this Proposed Plan are received.

COMPARISON OF ALTERNATIVES

1. Overall Protection of Human Health and the Environment

The RAOs for the OMC Plant 2 site ODC area and North and West Utility Corridors that are contaminated with PCBs and PCB DNAPL include the following:

- Prevent construction worker exposure, through contact, ingestion, or inhalation of contaminated soil that presents an ELCR greater than $1x10^{-4}$ to $1x10^{-6}$.

- Clean up soil and groundwater to the extent practicable to minimize migration of contaminants in groundwater.

The No Further Action Alternative is not protective because it allows future contact with the contaminated soils during potential redevelopment activities. It does not include the remediation or containment of the contaminated soil, which acts as a continuing source of groundwater contaminants. Alternative 2 prevents contact with the contaminated soil and minimizes groundwater contamination and migration by reducing infiltration through the PCB contaminated soil. Alternatives 3 and 4 also prevent contact with the contaminated soil, but further minimize groundwater contamination and migration by reducing infiltration and applying further containment technologies. They are considered protective of human health and the environment because they isolate the materials from human contact and include ICs to prevent uncontrolled excavation where necessary. Alternative 5 complies with the 2007 ROD because all contaminated soil would be excavated and disposed of off-site to meet the PCB cleanup level and thus would be protective.

2. Compliance with ARARs (see 2007 ROD)

Alternative 1 (No Further Action) does not comply with ARARs. Alternatives 2, 3, 4, and 5 are expected to comply with ARARs. The most important ARARs to be met relate to TSCA requirements, erosion controls during demolition, and air pollution emission requirements.

3. Long-term Effectiveness and Permanence

EPA evaluates the long-term effectiveness and permanence of the alternatives in terms of the magnitude of residual risk and the adequacy and reliability of controls. The residual risk of Alternative 1 (No Further Action) would remain unchanged for construction worker exposures. The residual risk for Alternative 2 related to contaminant migration remains, as there is some containment by not reducing infiltration to prevent migration of PCBs. And, without the vertical barrier wall of Alternative 3, PCBs may migrate in the subsurface to the groundwater or nearby surface water. Alternatives 3 and 4 have similar residual risk because the soil and groundwater are contained. Alternative 3 includes groundwater capture and treatment and Alternative 4 prevents leaching and groundwater migration through solidification. Alternative 5 has the greatest long-term effectiveness and permanence because all soil above PRGs is removed so there is no longer any source material onsite.

The adequacy and reliability of Alternatives 3, 4 and 5 are similar. The PCB contaminants do not leach readily, meaning they do not readily migrate in the groundwater. Alternative 3 includes a cover to prevent direct contact and minimize infiltration and vertical barriers to prevent groundwater migration. These controls are also considered adequate and reliable if the cap is routinely maintained. Alternative 4 includes stabilization/solidification to contain contaminated soils and prevent future leaching. In comparison, Alternative 5 is considered slightly more reliable in the long-term than Alternatives 3 and 4 because it does not rely on long-term maintenance of the onsite cover system or ICs. All contaminated material, other than that of the western and northern utility corridors are disposed of offsite.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Only Alternative 4 includes a significant treatment process. The mobility of PCBs is reduced through in-situ stabilization/solidification. Treatment residuals will consist of the solidified soil and will remain in place. The NCP preference for treatment would be met by Alternative 4. However, the solidification is anticipated to result in an actual increase in volume after the Portland cement or cement kiln dust is mixed with the soil. The actual volume increase would be dependent on the mix ratio, additives used and mechanical disturbance of the soil. Alternative 3 would include minor treatment of groundwater through the installation of extraction wells pumping to the existing water treatment system. PCB contamination is not expected to migrate significantly, but these alternatives contain any migration.

5. Short-term Effectiveness

There are no additional risks associated with the actual construction and implementation of Alternative 1 because no remedial action would be taken.

Except for Alternative 1, the remedial option that would cause the lowest impact to the remediation workers and the community is Alternative 2. This option has the least amount of truck traffic (estimate of 2,650 truckloads), shortest construction period (estimated at 10 weeks), and does not disturb the contaminated soil. Dust generated during construction activities would be from clean materials. Air particulates could be readily monitored and controlled through dust suppression methods.

Alternative 3 would require 2,800 truckloads of imported clean material and construction duration of 20 weeks. Like Alternative 2, there is no disturbance of the contaminated soil under Alternative 3, so there are minimal risks to the community or the environment.

Alternative 4 would also minimally impact the community because it requires the least amount of truck traffic and the work is performed in-situ minimizing construction worker exposure. Implementation of alternative 4 would require about 40 weeks.

Alternative 5 provides less short-term protection to the community than the other alternatives because of the large number of trucks (approximately 30,000 truckloads) that would be required to transport the contaminated material through populated areas from the site to the appropriate landfills. The trucking distance is significant (estimated to range up to 300 miles one way) due to the location of the Subtitle C and D disposal facilities. Alternative 5 creates the greatest disturbance of contaminated soils (e.g., dust or spills) thereby increasing the potential for construction workers, truckers, or citizens to be exposed to contaminants. These exposures could be addressed through proper decontamination and properly functioning tarp systems on

trucks, dust monitoring and suppression during construction, and appropriate erosion control measures. Alternative 5 requires the longest time to implement at an estimated 50 weeks.

6. Implementability

All of the alternatives can be implemented with readily available materials and methods. Alternative 5 would pose the greatest challenge due to the bracing and dewatering that would be required before deep excavation to the glacial till could occur.

7. Cost

The No Further Action Alternative has the least present worth cost, $30,000, as the only task associated with this alternative is the five-year review. The lowest cost alternative, excluding the No Action Alternative, is Alternative 2 at $2,100,000.

Alternative 3 would incur the next highest costs due to the capital costs associated with the installation of a vertical barrier. Alternative 3a includes the use of a slurry wall as the vertical barrier for a total alternative cost of $3,600,000. Alternative 3b uses sheet piling as the vertical barrier with a resulting total alternative cost of $6,600,000. Alternative 4 has a cost of $24,000,000 for the in-situ stabilization/solidification of the soil. Alternative 5 would be the most costly at $48,000,000 because it involves excavation and offsite disposal of all materials.

8. State Acceptance

Illinois EPA concurs with EPA's preferred alternative.

9. Community Acceptance

EPA will evaluate Community Acceptance of the Preferred Alternative after the public comment period ends and will be described in the Responsiveness Summary of the ROD Amendment.

I. Preferred Alternative

Cleanup Alternative 3

EPA, in consultation with IEPA, has proposed Alternative 3 (35 IAC Part 811 Cap, Vertical Barrier, ICs, and Monitoring) as its preferred alternative. Under Superfund, the selected remedy must meet the threshold criteria of Overall Protection of Human Health and the Environment, and Compliance with ARARs. Cleanup Alternative 3 meets these threshold criteria by containing and capping contaminated soil in the ODC building area and by covering, as necessary, the North and West Utility Corridors areas having residual contamination above ARAR-based TSCA limits. Soil contamination above Illinois EPA TACO Tier 1 levels would be covered. ICs ensure that any future planned disturbance of these covered areas at depth requires adequate sampling and proper disposal of contaminated soil and that the cover is then restored. Institutional and Engineering Controls will also prevent future direct soil contact exposures to construction, utility or similar workers digging in these areas. This remedy is protective and meets ARARs.

In addition to meeting the two threshold criteria, the selected remedy must be evaluated by assessing: long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. Cleanup Alternative 3

provides long-term and permanent protection against exposure to site-related contaminants by soil containment and capping in the ODC area and cover in the utility corridors area, coupled with appropriate ICs. Cleanup Alternative 3 does not reduce toxicity, mobility or volume of the contamination through treatment, however, containment using the slurry wall and soil cover is effective and practical for large quantities of soil containing significant levels of contamination. A minor amount of groundwater treatment would occur by groundwater extraction to the water treatment system. Cleanup Alternative 3 also provides short-term effectiveness when proper health and safety measures are taken. Cleanup Alternative 3 is implementable. Finally, Cleanup Alternative 3 meets the evaluation criteria at a much lower cost than Alternative 4 or 5 (the only other protective alternative that meets ARARs), and is therefore cost-effective.

In summary, Cleanup Alternative 3 meets the two threshold criteria of Overall Protection of Human Health and the Environment, and Compliance with ARARs. It also provides for the best mix of the balancing criteria, Long-Term Effectiveness and Permanence, Short-Term Effectiveness treatment to reduce Toxicity, Mobility, or Volume, Cost, and Implementability. The cost for Cleanup Alternative 3 is considerably less than for Alternatives 4 or 5, which cost significantly more for *in situ* remediation or off-site disposal of soil, respectively. Additional decision factors are as follows:

- Contamination discovered in the ODC building area of former Plant 2 extends below the water table making conventional excavation and dewatering extremely expensive.
- The same area, adjacent to the EJ & E Railroad property and adjoining the West Utility Corridor houses a large diameter sanitary sewer main flowing to the North Shore Sanitary District treatment plant with portions of the sewer main beneath the Plant 2 building footprint. Excavation near this sewer main would result in unacceptable risks.
- The northern most portion of the site revealed contamination that remains and this area overlies a 12-inch high-pressure natural gas pipeline and the North Shore sanitary sewer main, identified as the North Utility Corridor. Current technology cannot pin point the exact location of the sewer main or gas pipeline. The risk of excavating near this high pressure gas main is unacceptable due to potential structural damage and explosion possibilities.

J. Community Participation

EPA, in consultation with IEPA, will evaluate the public's response to the preferred cleanup alternative during the public comment period before deciding on a final cleanup alternative. Based on new information or public comments, EPA may either modify its preferred alternative or choose another. EPA encourages the public to review and comment on the cleanup alternatives.

EPA will respond in writing to all significant comments in a Responsiveness Summary, which is part of the final decision document called the Record of Decision Amendment. EPA will announce the selected cleanup alternative in local newspaper advertisements and will place a copy of the Record of Decision Amendment in the local information repositories.

Following the release of this document for public review, the public participation requirements set out in the NCP 300.435(c)(2)(ii) have been met.